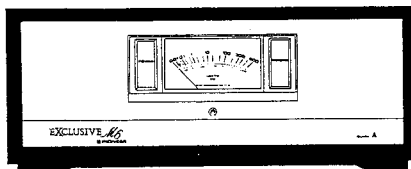


Service Manual



ORDER NO.
ARP1843

Power Amplifier

EXCLUSIVE M6

- This manual is applicable to the EXCLUSIVE M6/MEWZ type.

CONTENTS

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1. EXPLODED VIEWS AND PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1	AWH1004	POWER AMP ASSY		56	ATX1014	FERRITE BEAD L 20
	2	AWM1180	METER AMP ASSY		57	ATX1014	FERRITE BEAD L 23
	3	AWR1027	POWER SUPPLY ASSY		58	ATX1014	FERRITE BEAD L 24
	4	AXW1001	CR COMPLEX PARTS	Δ	59	ATX1015	FERRITE BEAD L 1
	5	PB112E	DIODE D 4	Δ	60	ATX1015	FERRITE BEAD L 2
	6	PB302F	DIODE D 3	Δ	61	ATS1213	POWER TRANSFORMER T1
	7	S25VB40	DIODE D 1	Δ	62	ATS1214	POWER TRANSFORMER T2
	8	S25VB40	DIODE D 2	Δ	63	ASG-545	SWITCH S1
	9	2SA1295	TRANSISTOR Q 1		64	ASH-016	SLIDE SWITCH S2
	10	2SA1295	TRANSISTOR Q 3		65	ASR-104	RELAY RY1
	11	2SA1295	TRANSISTOR Q 5	Δ	66	ASR-509	RELAY RY2
	12	2SC3264	TRANSISTOR Q 2		67	AKB1065	PHONO JACK 1-P
	13	2SC3264	TRANSISTOR Q 4		68	AKE-045	GROUND TERMINAL
	14	2SC3264	TRANSISTOR Q 6		69	AKE-056	TERMINAL A
Δ	15	ACN1045	RESISTOR R 1		70	AKE-057	TERMINAL B
	16	ACN1054	CARBON FILM RESISTOR R5		71	AKR1001	FUSE HOLDER
	17	RDR1/2PM472J	CARBON FILM RESISTOR R4		72	AEK-017	FUSE (T2A) FU1
	18	RDR1/2PM681J	CARBON FILM RESISTOR R3	Δ	73	AEK-404	FUSE (T6, 3A) FU2
	19	ACE-501	CQZA (0.01/250V) C 4		74	AEL-078	PILOT LAMP PL1
	20	ACE-080	CQZA (0.01/250V) C 8	Δ	75	ADG1053	AC POWER CORD
	21	ACE-080	CQZA (0.01/250V) C17	Δ	76	ANG1153	AC CORD SPACER
Δ	22	ACE-080	CQZA (0.01/250V) C18		77	AEB-214	RAMP HOLDER
	23	ACE1004	CFPA (0.047/AC250V) C5		78	AEC-525	NYLON RIVET
	24	ACE1045	CAPACITOR (FILM) C6		79	AEC-886	MICA SHEET
	25	ACE1045	CAPACITOR (FILM) C7		80	AEC-905	GROMMET
	26	ACF-002	CMA (100P/500V) C12		81	ABA-206	SCREW (STEEL)
Δ	27	ACG1005	CKA (0.01/AC150V) C15		82	ABA-268	SCREW
Δ	28	ACH1086	ELECTROLYTIC CAPACIT C1		83	ABA-298	SCREW
Δ	29	ACH1086	ELECTROLYTIC CAPACIT C2		84	ABA1004	SCREW (STEEL)
Δ	30	ACH1086	ELECTROLYTIC CAPACIT C3		85	ABA1006	SCREW (STEEL)
	31	CKDYF103Z50	CERAMIC CAPACITOR C9		86	ABA1009	SCREW (STEEL)
	32	CKDYF103Z50	CERAMIC CAPACITOR C10		87	ABA1011	SCREW (STEEL)
	33	CKDYF103Z50	CERAMIC CAPACITOR C11		88	ABA1024	SCREW
	34	RD1/4PM100J	CARBON FILM RESISTOR R6		89	ABA1027	SCREW
	35	AAW-135	PEAK METER		90	ABA1056	SCREW
	36	ATV1006	LINE TRANSFORMER		91	ABA1057	SCREW
	37	ATX1013	FERRITE BEAD L12		92	ABA1058	SCREW
	38	ATX1013	FERRITE BEAD L17		93	ABA1059	SCREW
	39	ATX1013	FERRITE BEAD L18		94	ABA1060	SCREW
	40	ATX1013	FERRITE BEAD L21		95	ABA1061	SCREW
	41	ATX1013	FERRITE BEAD L22		96	ABA1062	SCREW
	42	ATX1014	FERRITE BEAD L3		97	ABA1065	SCREW
	43				98	ABA1066	SCREW
	44	ATX1014	FERRITE BEAD L5		99	ABE-067	WASHER
	45				100	ABH-107	COIL SPRING
	46	ATX1014	FERRITE BEAD L7		101	ABN-054	NUTS
	47	ATX1014	FERRITE BEAD L8		102	ABN-061	NUT
	48	ATX1014	FERRITE BEAD L9		103	BMH30P080FCC	SCREW
	49	ATX1014	FERRITE BEAD L10		104	CMZ30P060FCC	SCREW
	50	ATX1014	FERRITE BEAD L11		105	NB40BKI	NUT
	51	ATX1014	FERRITE BEAD L13		106	NB50BKI	NUT
	52	ATX1014	FERRITE BEAD L14		107	PMZ30P050FCC	SCREW
	53	ATX1014	FERRITE BEAD L15		108	WAX0W150D100	WASHER
	54	ATX1014	FERRITE BEAD L16		109	WA32W070D050	WASHER
	55	ATX1014	FERRITE BEAD L19		110	WA45T110W050	WASHER

Note: For parts of No.36-No.60 please refer to page 7.

Mark	No.	Part No.	Description
	111	WC30BKI	WASHER
	112	WC40BKI	WASHER
	113	WH40FUC	WASHER
	114	WH40PKI	WASHER
	115	WS30PKI	WASHER
	116	WS40PKI	WASHER
	117	WS50PKI	WASHER
	118	YS60F8T	WASHER
	119	ANR-540	BASE
	120	AAT-011	RING
	121	AMM1091	CABINET
	122	ARC1152	OPERATING INSTRUCTIONS
	123	ADE-060	PULG CORD
	124	E33-009	SHEET
	125	AHA-320	FRONT PAD ASSY
	126	AHA-321	REAR PAD ASSY
	127	AHB-128	REAR SPACER
	128	AHC-066	CASE
	129	AHD1638	PACKING CASE
	130	AHG-155	VINYL POUCH
	131	AHG-163	SHEET
	132	AWL1030	FRONT PANEL ASSY
	133		DPS ASSY
	134	AWZ2049	VOLTAGE AMPLIFYING ASSY
	135	AWZ2050	POWER AMPLIFYING ASSY
	136		LAMP ASSY
	137		TERMINAL STRIP 2-P
	138		TERMINAL 2-P
	139	ABA1097	SCREW
	140		
	141		
	142		
	143		
	144		
	145		
	146		
	147		
	148		
	149		
	150		
	151		
	152		3P SOCKET
	153		
	154		
	155		
	156		
	157		
	158		SIDE FRAME R
	159		CHEMICON FRAME
	160		TRANS FRAME
	161		REAR PANEL
	162		PANEL STAY
	163		HEAT SINK
	164		NAME PLATE
	165		PLATE A
	166		PLATE B
	167		PLATE
	168		TRANS HOLDER
	169		EARTH PLATE
	170		GROUND PLATE

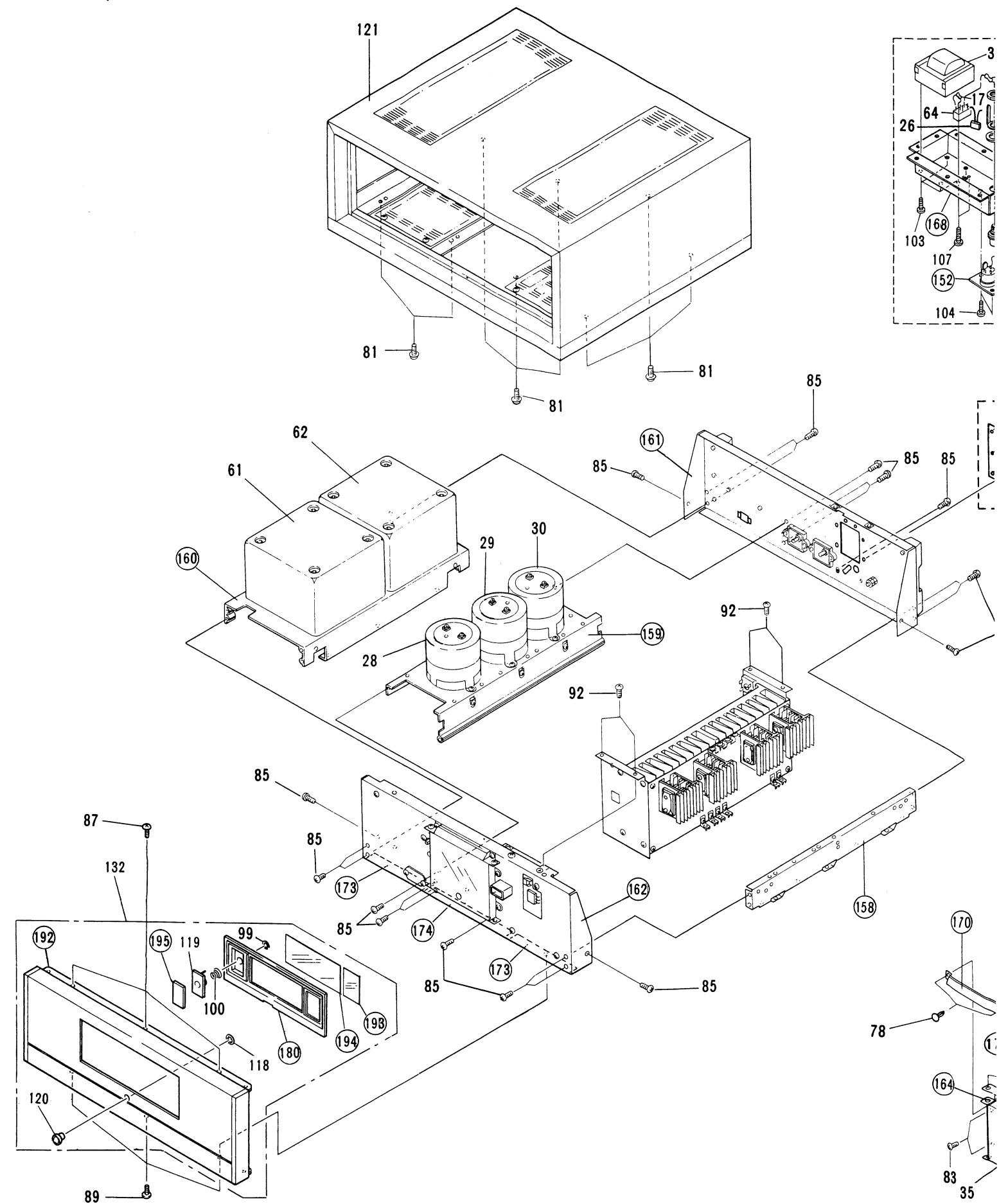
Mark	No.	Part No	Description
	171		SHIELD PLATE
	172		CUSHION
	173		
	174		COVER
	175		
	176		BINDER
	177		
	178		BINDER
	179		PLATE
	180		METER ESCUTCHEON
	181		CUSHION RUBBER
	182		SPACER
	183		NAME PLATE
	184		
	185		
	186		SCREW
	187		SCREW
	188		WASHER
	189		TERMINAL GUARD
	190		HEAT SINK HOLDER L
	191		HEAT SINK HOLDER R
	192		FRONT PANEL SUB ASSY
	193		DISPLAY PLATE
	194		GLASE PLATE
	195		PUSH PLATE

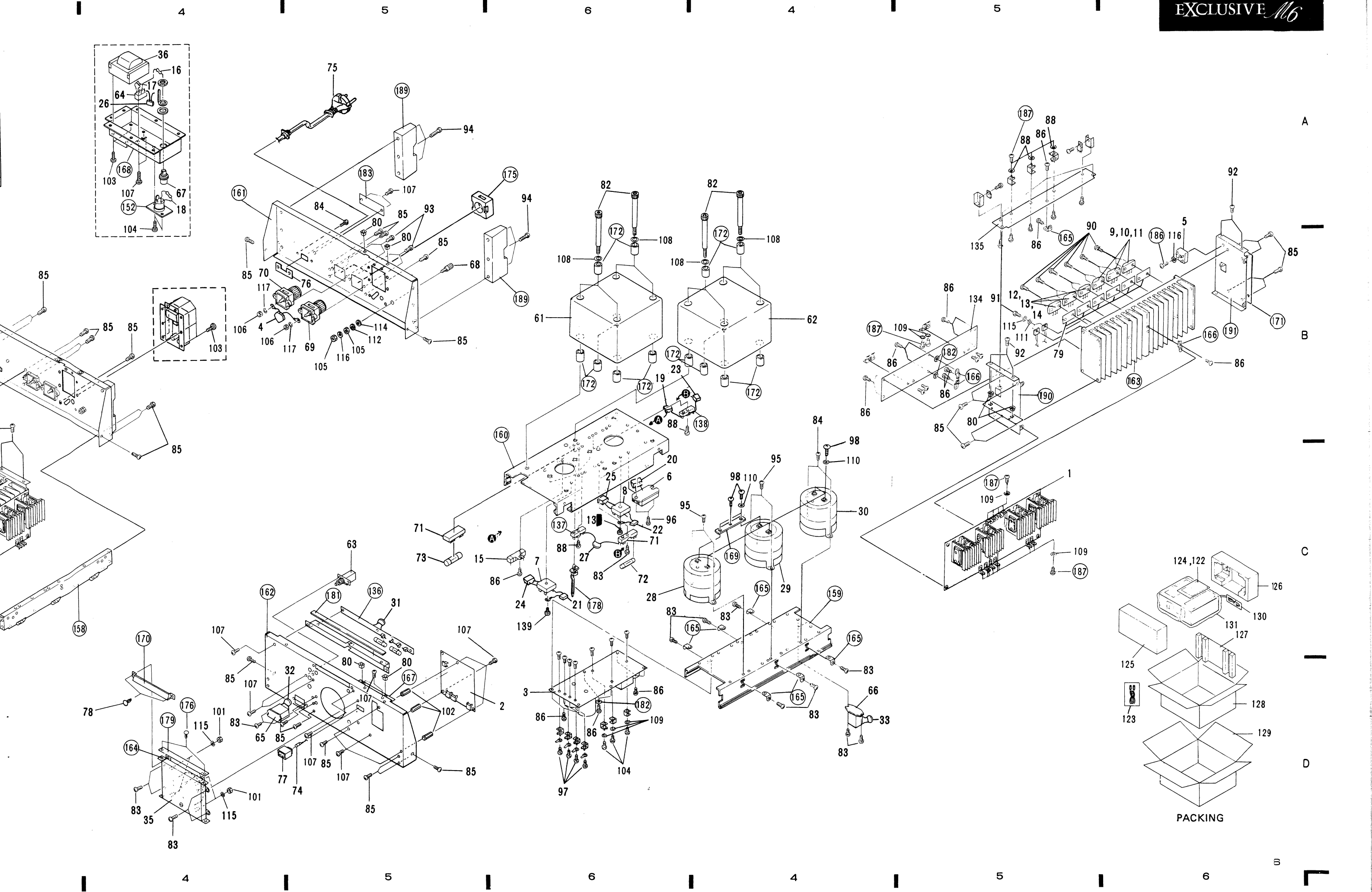
A

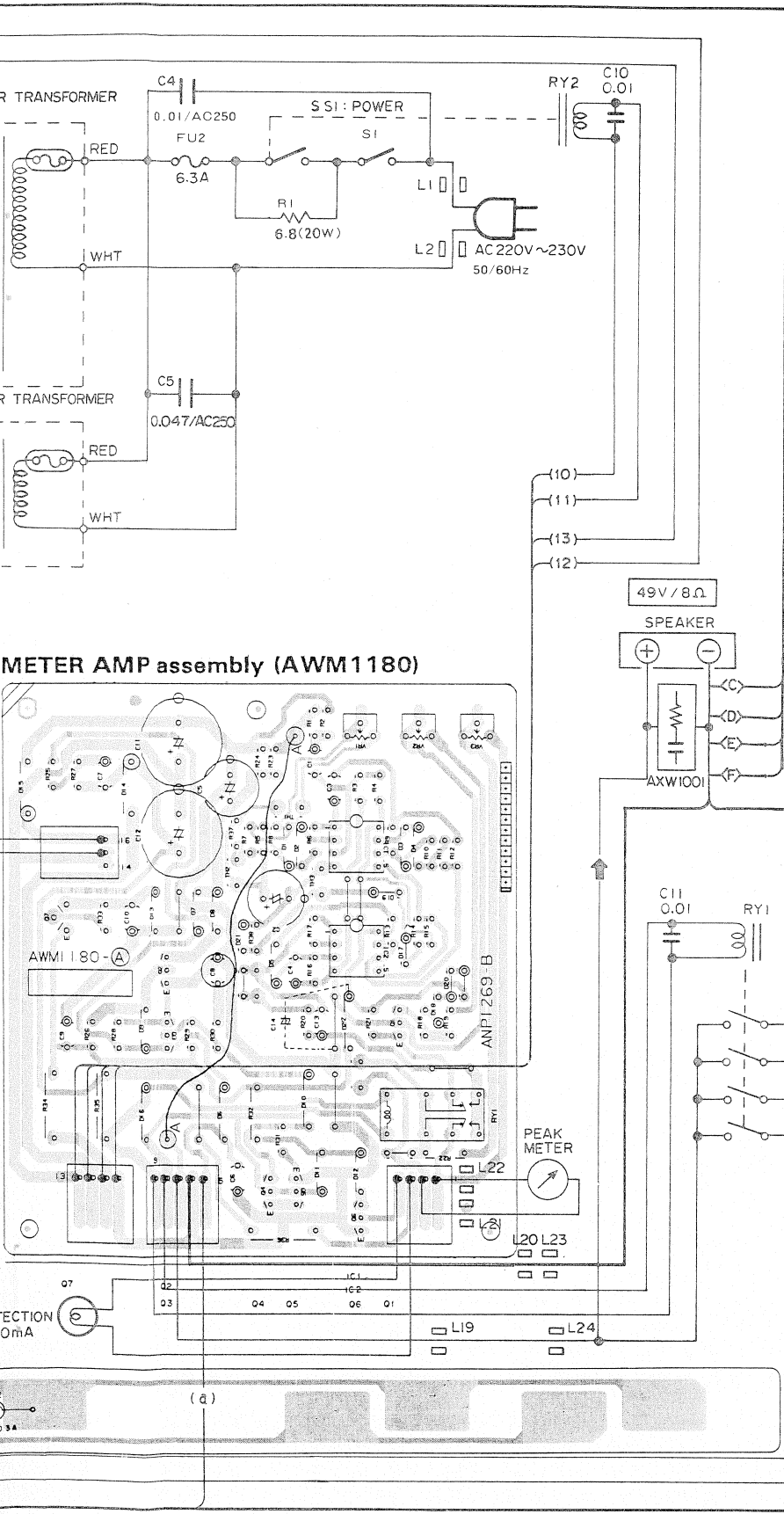
B

C

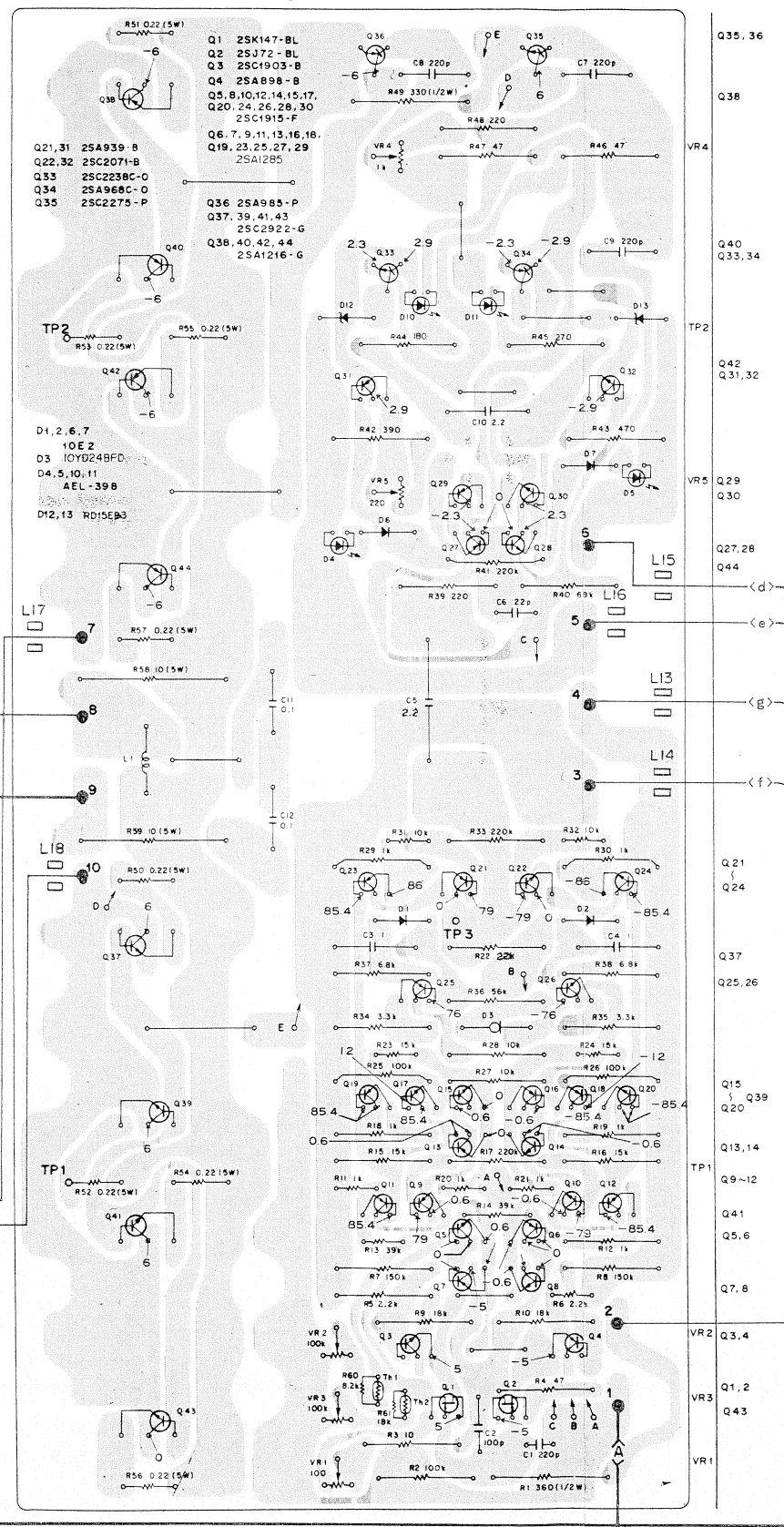
D







POWER AMP assembly (AWH1004)



Q35, 36
Q38
VR4
Q40
Q33, 34
TP2
Q42
Q31, 32
VR5
Q29
Q30
Q27, 28
Q44
(d)
(e)
(g)
(f)

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504		Transistor
Q215		Radiator type transistor
D203		Diode
R237		Resistor
C513		Capacitor (Polarity)
C518		Capacitor (Non-polarity)

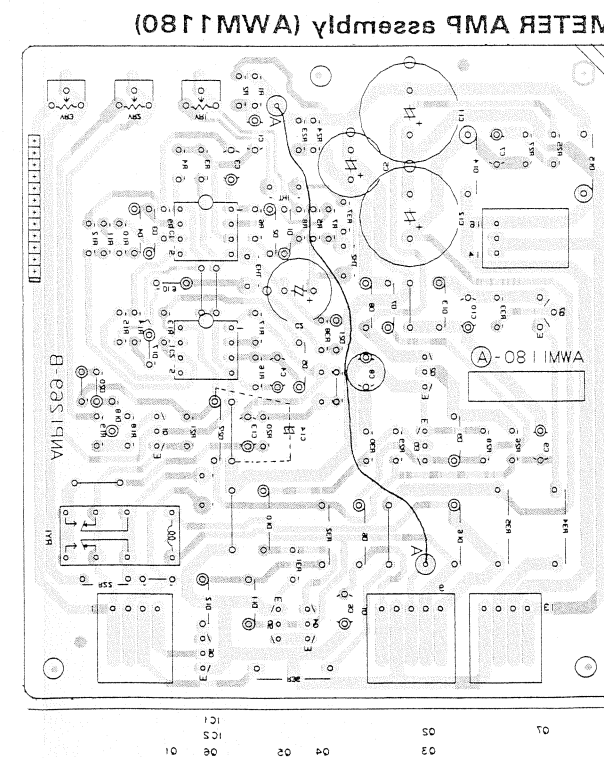
Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

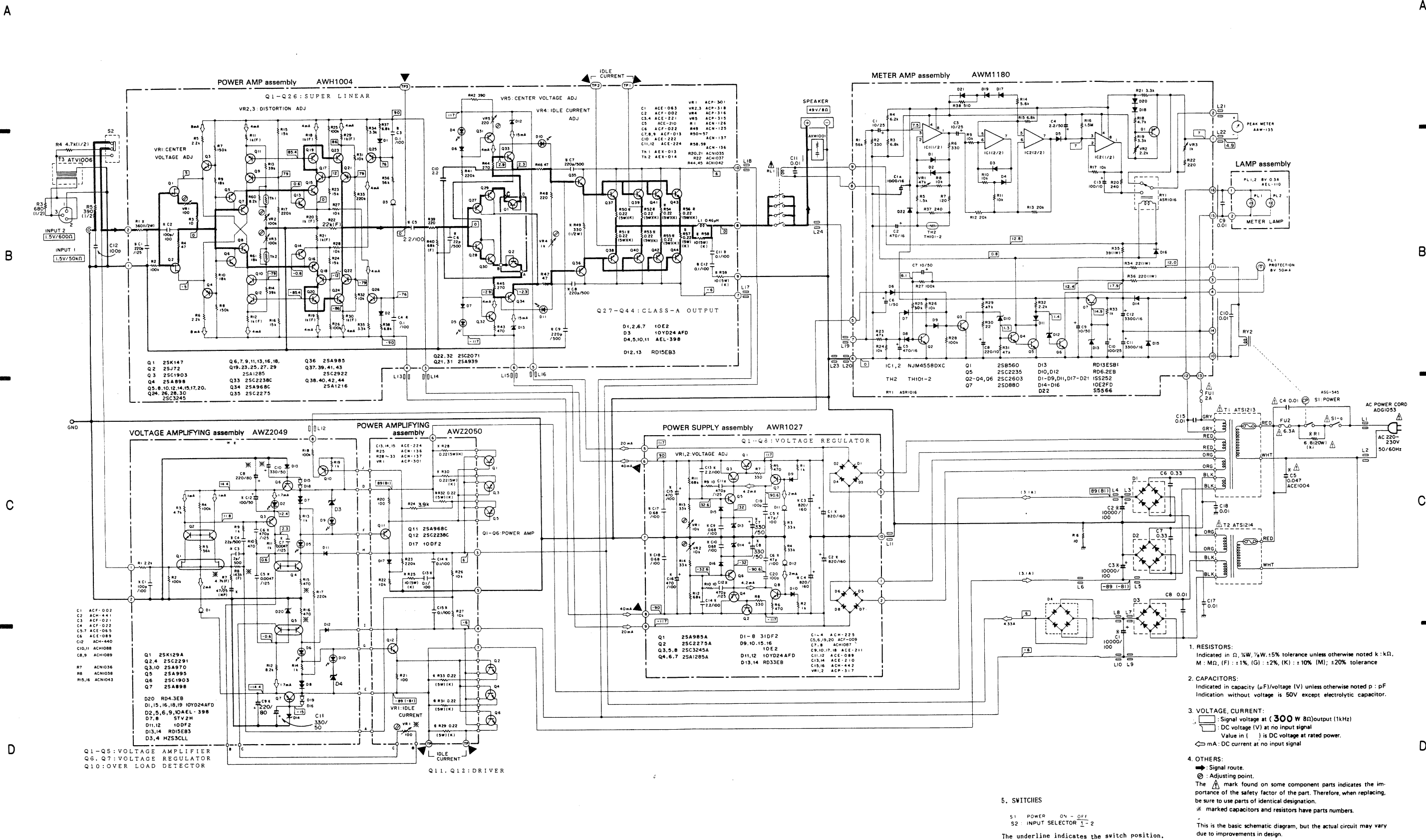
3. The capacitor terminal marked with ⊖ (double circles) shows negative terminal.
4. The diode terminal marked with ⊖ (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

NOTE:

This picture shows the foil side of the printed circuit.



3. SCHEMATIC DIAGRAM



4. ELECTRICAL PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The \triangle mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω 56×10^1 561.....RD1/4PS \triangle \square \square J

47k Ω 47×10^3 473.....RD1/4PS \triangle \square \square J

0.5 Ω 0R5.....RN2H \triangle \square \square K

1 Ω 010.....RS1P \triangle \square \square K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω 562×10^1 5621.....RN1/4SR \triangle \square \square \square F

Miscellaneous parts

P.C.BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	POWER AMP assembly	AWH1004
	METER AMP assembly	AWM1180
	VOLTAGE AMPLIFYING assembly	AWZ2049
	POWER AMPLIFYING assembly	AWZ2050
	POWER SUPPLY assembly	AWR1027

LAMP assembly

OTHERS

Mark	Symbol & Description	Part No.
	Q1,Q3,Q5 Transistor	2SA1295
	Q2,Q4,Q6 Transistor	2SC3264
	D4 Bridge diode	PB112E
	D3	PB302F
	D1,D2	S25VB40
\triangle	S1 Push switch (POWER)	ASG-545
	S2 Slide switch (INPUT SELECTOR)	ASH-016
	RY1 Relay (MUTING)	ASR-104
\triangle	RY2 Relay (SURGE KILLER)	ASR-509
\triangle	T1 Power transformer (AC220V)	ATS1213
\triangle	T2 Power transformer (AC220V)	ATS1214
	T3 Line transformer	ATV1006
	L12,L17,L18,L21,L22	ATX1013
	Ferrite bead	
	L3-L11,L13-L16,L19,L20,L23,	ATX1014
	L24 Ferrite bead	
\triangle	L1,L2 Ferrite bead	ATX1015
	Peak meter	AAW-135
\triangle	FU1 Fuse (T2A/250V)	AEK-017
\triangle	FU2 Fuse (T6.3A/250V)	AEK-404
	PL1 Pilot lamp	AEL-078
	CR Complex parts	AXW1001

Mark	Symbol & Description	Part No.
	C8,C17,C18 (0.01/250V)	ACE-080
\triangle	C5 (0.047/250V)	ACE1004
	C6,C7 (0.33 μ F)	ACE1045
	C12 (100p/500V)	ACF-002
	C15 (0.01/150V)	ACG1005

\triangle	C1,C2,C3 (10000/100V)	ACH1086
	C9,C10,C11	CKDYF103Z50
	C16	CQSA102J160
	C4	ACE-501
\triangle	R1 (6.8/20W)	ACN1045
	R5 (390 Ω /1/2W)	ACN1054
	R4	RDR1/2PM472J
	R3	RDR1/2PM681J

\triangle	AC Power cord	ADG1053
\triangle	AC cord spacer	ANG1153

	Terminal 1P	AKB1065
	Terminal (EARTH)	AKE-045
	Terminal A (OUTPUT)	AKE-056
	Terminal B (OUTPUT)	AKE-057
	Fuse holder	AKR1001

POWER AMP assembly (AWH1004)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q38,Q40,Q42,Q44	2SA1216
	Q6,Q7,Q9,Q11,Q13,	2SA1285
	Q16,Q18,Q19,Q23,Q25,	
	Q27,Q29	
	Q4	2SA898
	Q21,Q31	2SA939
	Q34	2SA968C
	Q36	2SA985
	Q3	2SC1903
	Q22,Q32	2SC2071

Mark	Symbol & Description	Part No.
	Q33	2SC2238C
	Q35	2SC2275
	Q37,Q39,Q41,Q43	2SC2922
	Q5,Q8,Q10,Q12,Q14,	2SC3245
	Q15,Q17,Q20,Q24,Q26	
	Q28,Q30	
	Q2	2SJ72
	Q1	2SK147
	D4,D5,D10,D11 LED	AEL-398
	D12,D13 Zener Diode	RD15EB3
	D1,D2,D6,D7	10E2
	D3	10YD24BFD
	TH1 Positive Thermistor	AEX-013
	TH2 Positive Thermistor	AEX-014

COIL

Mark	Symbol & Description	Part No.
	L1 AF choke coil	ATH-066

CAPACITORS

Mark	Symbol & Description	Part No.
	C1 (220p/125V)	ACE-063
	C5 (2.2 μ)	ACE-210
	C3,C4 (0.1 μ)	ACE-221
	C10 (2.2 μ)	ACE-222
	C11,C12 (0.1 μ)	ACE-224
	C2 (100 μ)	ACF-002
	C7-C9 (220p)	ACF-013
	C6 (22p)	ACF-022

RESISTORS

Mark	Symbol & Description	Part No.
	VR1 (100 Ω)	ACP-301
	VR5 (220 Ω)	ACP-315
	VR4 (1k Ω)	ACP-316
	VR2,VR3 (100k Ω)	ACP-318
	R49 (330 Ω /1/2W)	ACN-125
	R1 (360 Ω /1/2W)	ACN-126
	R58,R59 (10 Ω /5W)	ACN-136
	R50-R57 (0.22/5W)	ACN-137
	R20,R21 (1k Ω)	ACN1035
	R22 (22k Ω)	ACN1037
	R44,R45 (180 Ω)	ACN1042
	R11,R12,R18,R19,R29,R30	RDH1/4P1001F
	R40	RDH1/4P6802F
	Other resistors	RDH1/4P $\square\square\square$ J

METER AMP assembly (AWM1180)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1,IC2	NJM4558DXC
	Q1	2SB560
	Q5	2SC2235
	Q2-Q4,Q6	2SC2603
	Q7	2SD880
	D13 Zener Diode	RD13ESB1
	D10,D12 Zener Diode	RD6.2EB
	D1-D9,D11,D17-D21	1SS252
	D14-D16	10E2FD
	D22	S5566
	TH2 Thermistor	TH101-2

RELAY

Mark	Symbol & Description	Part No.
	RY1 Relay	ASR1016

CAPACITORS

Mark	Symbol & Description	Part No.
	C4	CEANL2R2M50
	C6	CEAS010M50
	C1,C3	CEAS100M25
	C7,C9	CEAS100M50
	C13	CEAS101M10
	C14	CEAS102M16
	C10	CEAS101M25
	C8	CEAS221M10
	C11,C12	CEAS332M16
	C2,C5	CEAS471M16

RESISTORS

Mark	Symbol & Description	Part No.
	VR3 (1k)	VRTS6HS102
	VR2 (2.2k)	VRTS6HS222
	VR1 (47k)	VRTS6HS473
	R34-R36	RS1LMF $\square\square\square$ J
	Other resistors	RD1/8PM $\square\square\square$ J

VOLTAGE AMPLIFYING assembly (AWZ2049)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q7	2SA898
	Q3,Q10	2SA970
	Q5	2SA995
	Q6	2SC1903
	Q2,Q4	2SC2291
	Q1	2SK129A

POWER SUPPLY assembly (AWR1027)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q4,Q6,Q7	2SA1285A
	Q1	2SA985A
	Q2	2SC2275A
	Q3,Q5,Q8	2SC3245A
	D13,D14 Zener Diode	RD33EB
	D9,D10,D15,D16	10E2
	D11,D12	10YD24AFD
	D1-D8	31DF2

CAPACITORS

Mark	Symbol & Description	Part No.
	C11,C12 (470p/DC125V)	ACE-089
	C13,C14 (2.2)	ACE-210
	C9,C10,C17,C18 (0.68)	ACE-211
	C5,C6,C19,C20 (10p)	ACF-009
	C1-C4 (820µF/160V)	ACH-225
	C15,C16 (470/100V)	ACH-442
	C7,C8 (330/50V)	ACH1087

RESISTORS

Mark	Symbol & Description	Part No.
	VR1,VR2 (10k)	ACP-317
	Other resistors	RDH1/4P□□□J

LAMP assembly

OTHERS

Mark	Symbol & Description	Part No.
	PL1,PL2 Pilot lamp	AEL-110

CR Complex parts (AXW1001)

No parts are supplied with the CR Complex parts.

Mark	Symbol & Description	Part No.
	D2,D5,D6,D9,D10 LED	AEL-398
	D3,D4 Zener Diode	HZS3CLL
	D13,D14 Zener Diode	RD15EB3
	D20 Zener Diode	RD4.3EB
	D7,D8 Varistor	STV2H
	D11,D12	10DF2
	D1,D15,D16,D18,D19	10YD24AFD

CAPACITORS

Mark	Symbol & Description	Part No.
	C5,C7 (4700p/DC125V)	ACE-065
	C6(470p/DC125V)	ACE-089
	C1 (100p)	ACF-002
	C3 (2p)	ACF-021
	C4 (22p)	ACF-022
	C12 (100µF/50V)	ACH-440
	C2 (47µF/25V NP)	ACH-441
	C10,C11 (220/80)	ACH1088
	C8,C9 (330/50)	ACH1089

RESISTORS

Mark	Symbol & Description	Part No.
	R7 (4.7k)	ACN1036
	R8 (143k)	ACN1038
	R15,R16 (470Ω)	ACN1043
	Other resistors	RDH1/4P□□□J

POWER AMPLIFYING assembly (AWZ2050)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q11	2SA968C
	Q12	2SC2238C
	D17	10DF2

COIL

Mark	Symbol & Description	Part No.
	L1,L2 Ferrite bead	ATX1014

CAPACITORS

Mark	Symbol & Description	Part No.
	C13-C15 (0.1/100V)	ACE-224

RESISTORS

Mark	Symbol & Description	Part No.
	VR1 (100Ω)	ACP-301
	R25 (10Ω/5W)	ACN-136
	R28-R33 (0.22/5W)	ACN-137
	Other resistors	RDH1/4P□□□J

5. CIRCUIT DESCRIPTION

The input signal is output to the OUTPUT terminal through the NON-NFB voltage amplifying and class-A output stages and the muting relay. The power supply section consists of the exclusive class-A bias floating power supply, the main power supply providing power to the speakers, ± 90 V stabilizing power supply providing power to the NON-NFB super-linear circuit (SLC), and the 15 V stabilizing power supply for the protection circuit and meter amplifier. The exclusive class-A bias power supply is isolated from the ground. Both ends of this power supply are driven by the dynamic power supply at the same level and with the same phase as the class-A output. The connected circuit includes the surge-suppression circuit and the protection circuit for muting during power-on/off, DC detection, and overload protection. The peak meter is driven by inputting the signal output to the speaker terminal to the meter amplifier.

5.1 SUPER-LINEAR CIRCUIT (SLC)

The SLC basic configuration is the same as C-ZI and M-ZI. Non-linear distortion of Q2 VEE is totally reduced by equalizing the Q1 current with the Q3 and Q4 current-mirror circuit, generating distortion in the reverse mode of the Q2 distortion to offset the Q2 distortion (refer to C-ZI and M-ZI). The following two items are improved in M5.

1. Addition of the Distortion Adjusting Circuit

As shown in Figure 5-2, Basic Circuit Diagram, by adding R1, Th1, and VR1 current is distributed to the ground from Q3 emitter to reduce the Q1 operation current and to cause distortion so that the distortion, including that at the subsequent output stage, will be eliminated. At the same time, incomplete SLC operation caused by element discrepancy can be compensated to complete the distortion eliminating operation and to improve the SLC thermal compensation by the posister (??).

2. SLC for Counter-Ground Amplifying

As shown in Figure 5-2, counter-ground amplifying is done by connecting the emitter resistance R5 of the Q2 emitter ground amplifying circuit. This eliminates both the power supply noise generated in the conventional SLC and the impedance influence so that sound quality is improved.

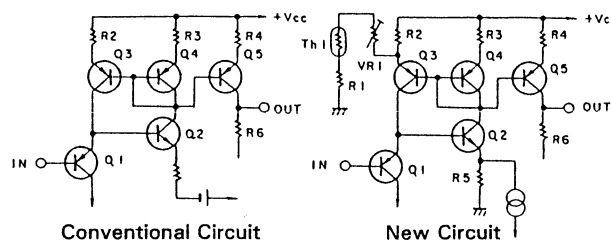


Figure 5-2 Basic Circuit Diagram

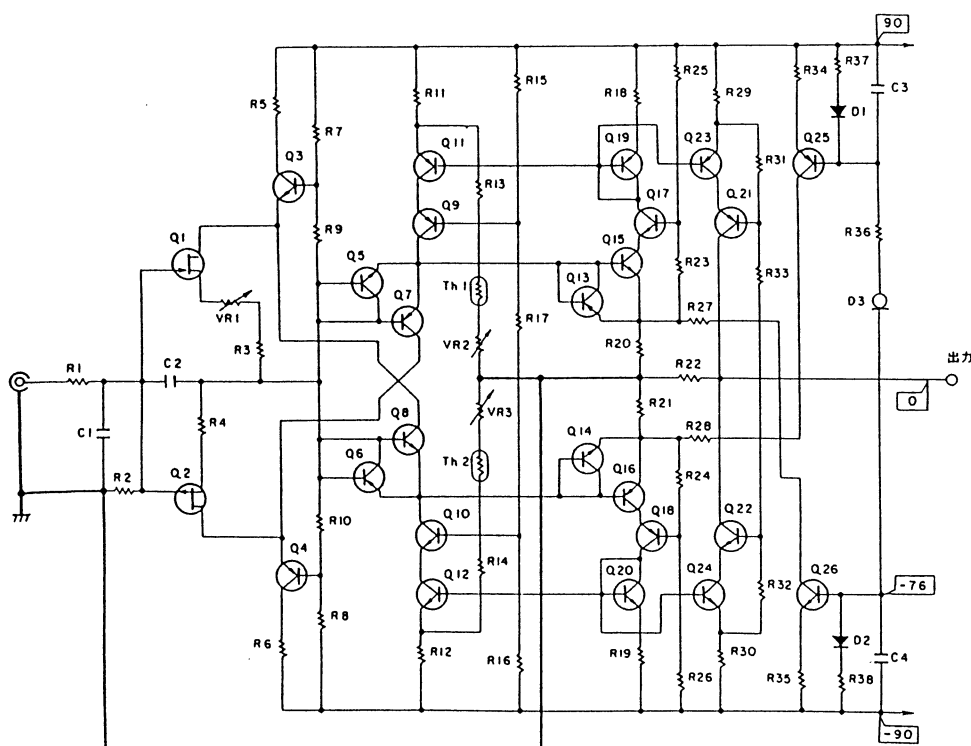


Figure 5-1 Power Amplifier (Super-Linear Circuit)

5.2 CLASS-A OUTPUT STAGE

To provide 300 W power output with NON-NFB, a five-stage darlington connection is used by connecting four P_C 200 W transistors in parallel at the final stage. The PNP and NPN of the transistors at the first and second stages are used in reverse so that the input offset voltage will not be generated. D10, D11, R46, and R47 prevents overcurrent flowing to Q33 and Q34 and damaging the transistor due to the saturation of the final stage during output clipping. The Q33 and Q34 driving current is limited by the current value of

the constant current power supply by Q31 and Q32. But damage to Q27 to Q30 is possible. Since the Q27 and Q29 collector voltage is the Q34 emitter output voltage, as shown in Figure 5-3 (Q28 and Q30 collector voltage is the Q33 emitter output voltage), the voltage between the base and collector of Q27 to Q30 is constant regardless of the signal level, so that the distortion factor can be improved. VR5 and VR4 are the semi-fixed variable control for output center point adjustment and class-A idling adjustment, respectively.

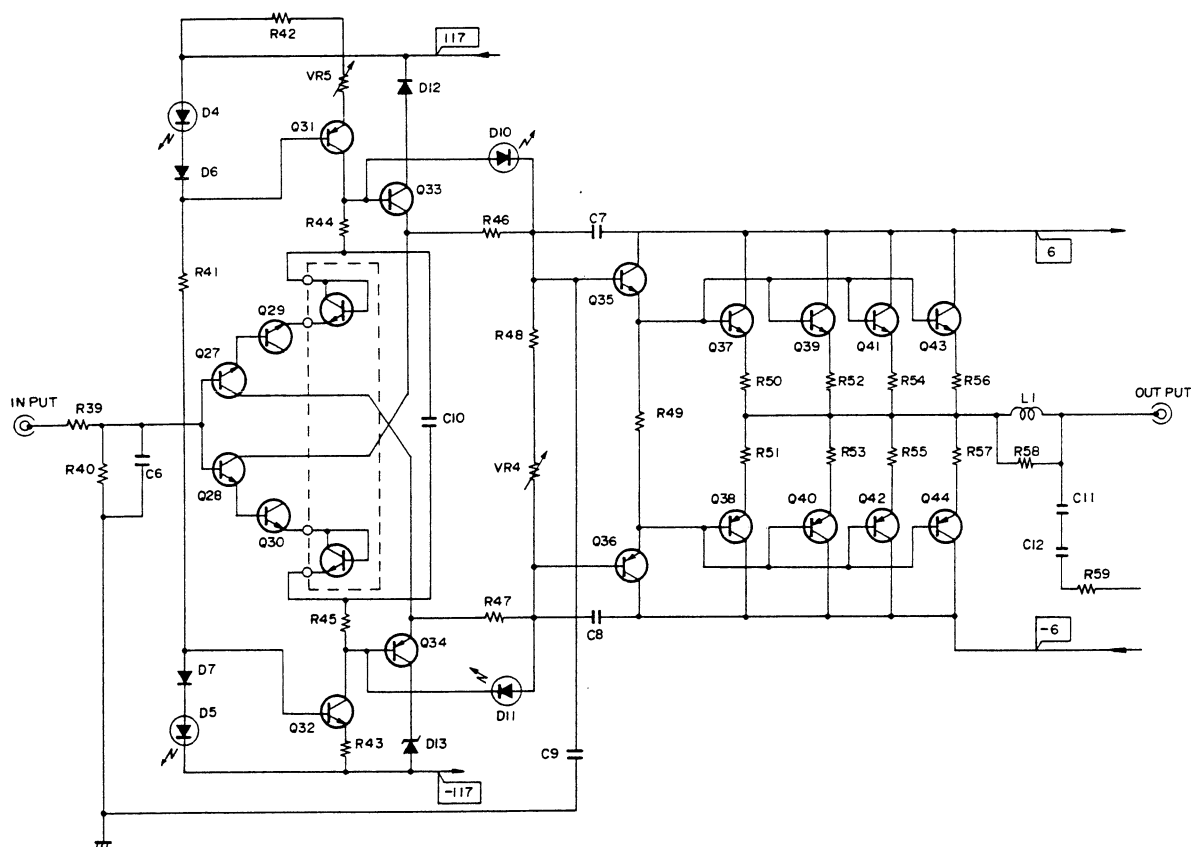


Figure 5-3 Class-A Output Stage

5.3 POWER SUPPLY SECTION

In general, since the class-A amplifier consumes much power and discharges most of the power to the outside as heat, it is a very inefficient method. A large-output 300 W amplifier has a problem in processing the generated heat in addition to its inefficiency. This device improves the efficiency of the class-A amplifier by improving the power supply section. As shown in Figure 5-4 Block Diagram, the power supply section consists of the power supply B1 for the class-A operating idle current and the power supply (dynamic power supply) for varying the voltage depending on the input signal.

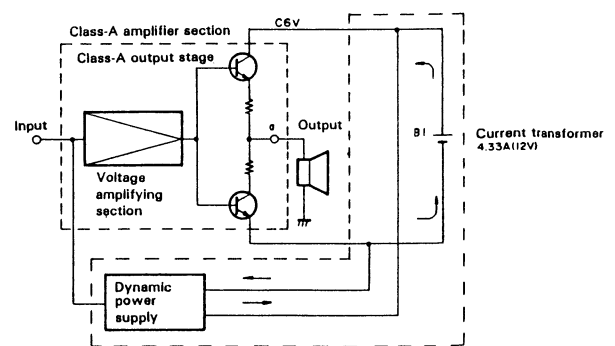


Figure 5-4 Block Diagram

This circuit has little heat generation and power consumption since only 4.4 A (12 V) idle current, equivalent to the 300 W class-A amplifier, flows between points 'c' and 'd'. However, voltage is supplied between points 'c' and 'd' according to the input signal by the operation of the dynamic power supply when a signal is input to the input terminal. In this device the power supply is driven by synchronizing with the output signal at point 'a'.

Dynamic Power Supply

Figure 5-5 shows the circuit diagram. The input signal is amplified at Q1, Q3 and Q4 (Q5) and sent to the output stage. The output signal sent to the class-A amplifier power supply is collected by R26 and R27 and fed back to Q1 to improve the characteristics. D3, D4, D9, and D10 are the output stage current limiters

which instantaneously protect the power transistor against an output stage overload such as a short circuit. Q10, R19, R22, R23, R24 and D17 compose the Pc detection type overload detecting circuit and turn off the muting relay if the output stage current exceeds the specified value. The output stage has a non-switching configuration, in which current always flows to D7 and D8 by R17. D5, D6, D11 and D12 prevent the output transistor from saturating during output clipping.

Constant Voltage Power Supply

The constant voltage circuit is a conventional inverted darlington stabilizing circuit (Figure 5-6).

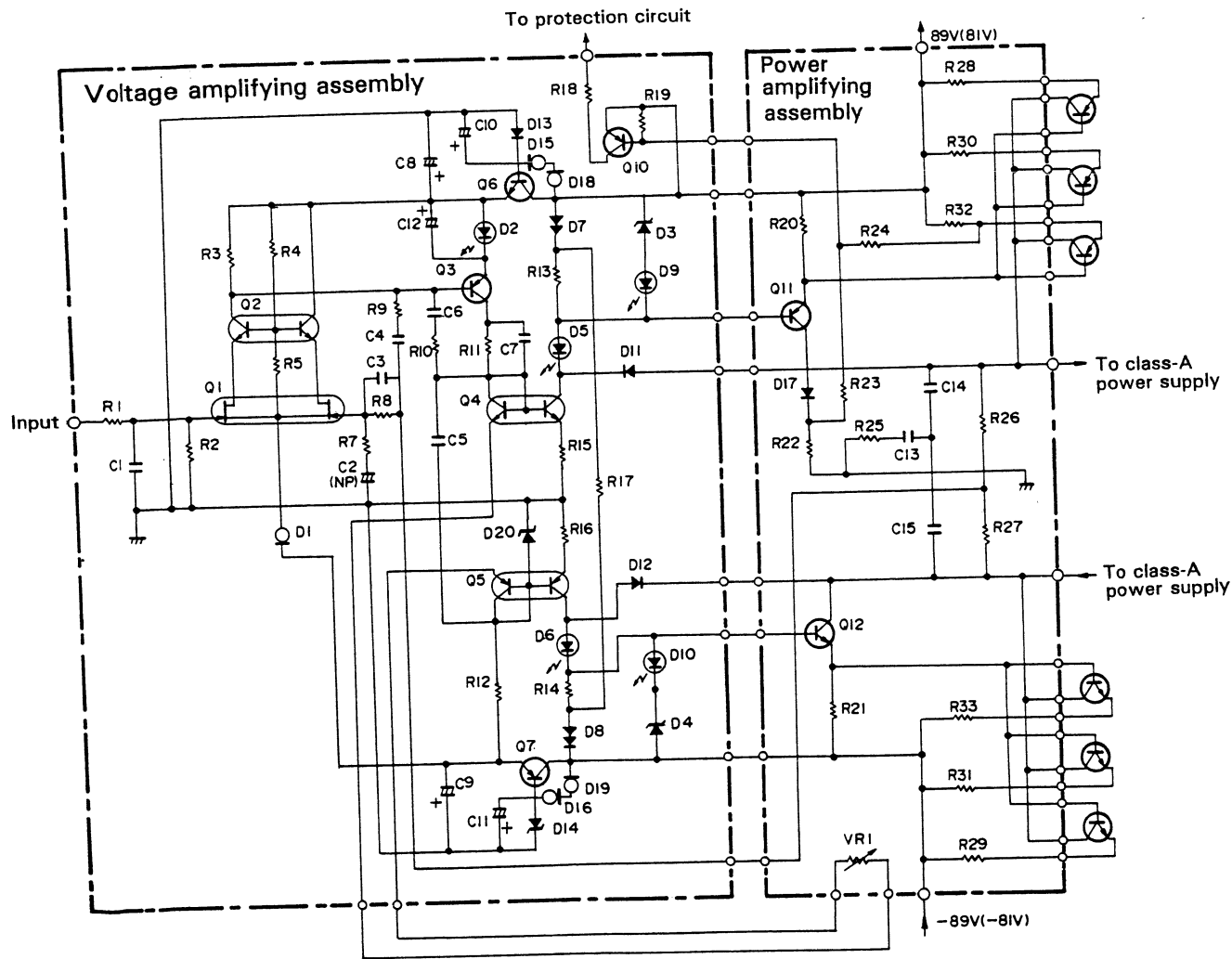


Figure 5-5 Dynamic Power Supply

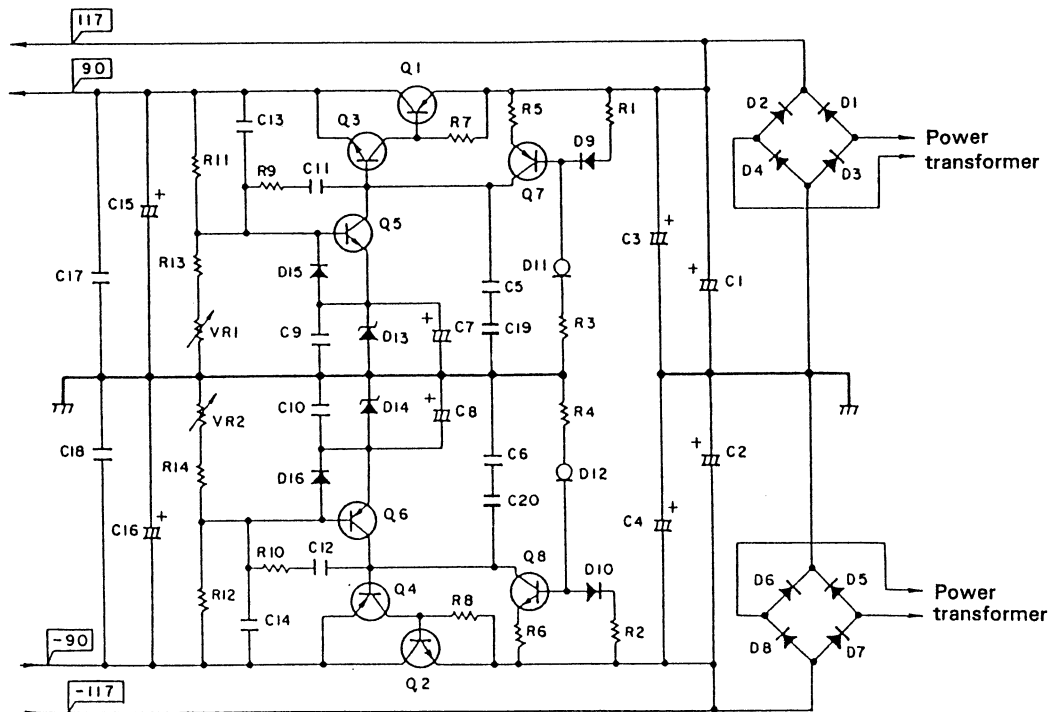


Figure 5-6 Constant Voltage Power Supply

5.4 METER AMP SECTION

The meter amplifier circuit uses the operation amplifier IC as shown in Figure 5-7. VR1 is a semi-fixed variable resistor which adjusts the -30 dB point (diodes are connected in parallel to control the compression ratio). VR2 is a semi-fixed VR for zero-point

adjustment. VR3 is a semi-fixed VR for sensitivity adjustment and performs 300 W 0 dB adjustment. Th1 is a thermistor for thermal compensation and RL1 is a relay for preventing abnormal operation of the meter during power-on/off.

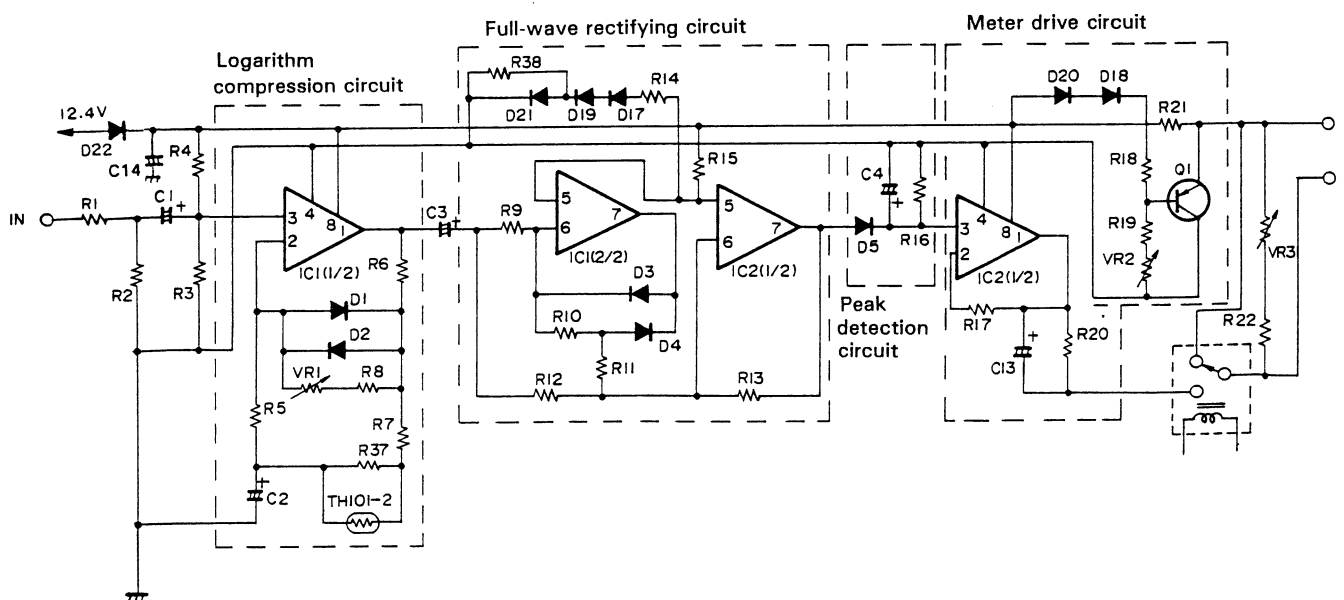


Figure 5-7 Meter Amplifier

5.5 PROTECTION CIRCUIT

Figure 5-8 shows the circuit diagram. The protection circuit performs the muting operation during power-on/off, the DC detection protection operation, and during overload protection using the signal from the overload detecting section.

• Muting during power-on/off

When the power is turned on, the muting relay is turned off for approximately 12 seconds by the R30 and C8 power charge circuit, disconnecting the speaker output. After approximately 12 seconds, Q4 and Q5 are turned on to turn the muting relay on. At the same time, Q6 is turned off to turn the protection lamp off. When the power is turned off, the trailing voltage of the chemical capacitor in the power supply is detected to turn Q2 off and Q3 on so that C8 is discharged quickly to turn the muting relay off.

• DC detection protecting operation

For positive DC input, Q3 is turned on through D7 to discharge C8, so that the muting relay is turned off. For negative DC input, Q2 is turned off to turn Q3 on so that C8 is discharged.

• Overload protecting operation

The signal from the overload detecting section in the dynamic power supply assembly turns Q3 on through D6. When Q3 is turned on, C8 is discharged so that the muting relay is turned off.

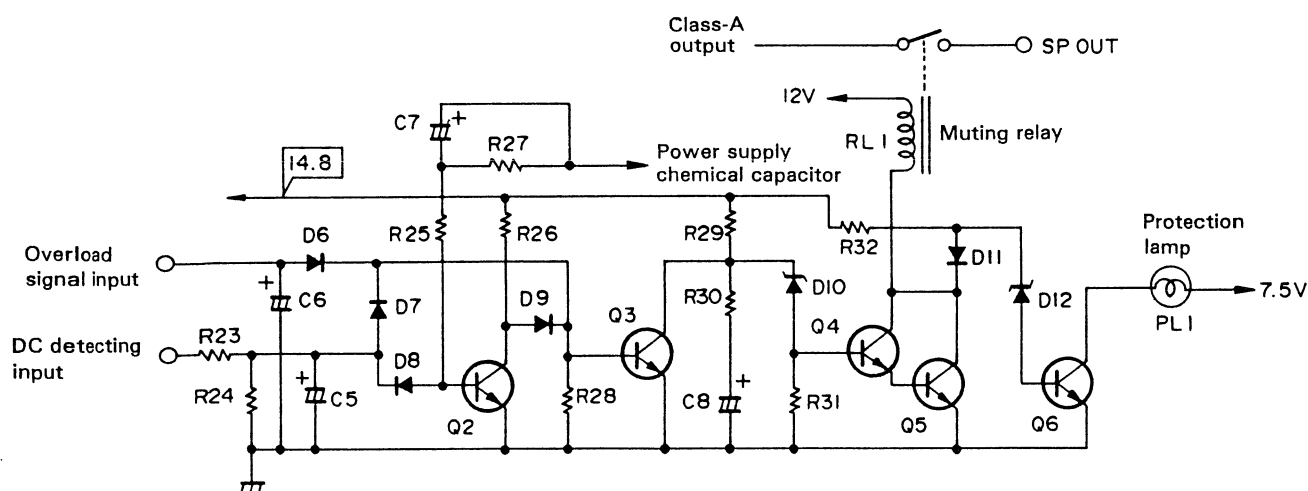


Figure 5-8 Protection Circuit

6. ADJUSTMENTS

6.1 Power Amplifier Assembly Adjustment

■ Adjusting the idle current

Connect the voltmeter between test point TP1 and TP2 terminals. Rotate VR4 so that the TP1-TP2 voltage will be $0.46 \text{ V} + 0.1 \text{ V}$ and -0 .

■ Adjusting the output center point

Connect the voltmeter to the speaker output terminal. Rotate VR5 so that the speaker terminal DC voltage will be $0 \text{ V} +/\text{- } 10 \text{ mV}$.

■ Adjusting the SLC center point

Connect the voltmeter to test point TP3 terminal. Rotate VR1 so that the TP3 DC voltage will be $0 \text{ V} +/\text{- } 0.1 \text{ V}$.

■ Distortion control

Connect the low-frequency oscillator to the input terminal, input a 1 kHz signal, and adjust the oscillator so that the speaker output terminal has 200 W output. Connect the distortion factor meter to the speaker output terminal and rotate the variables VR2 and VR3 so that the distortion will be minimized.

Note:

The adjustment should be performed in the following order: 1. adjust the idle current, 2. adjust the output center point, 3. adjust the SLC center point, 4. adjust the idle current, 5. distortion adjustment.

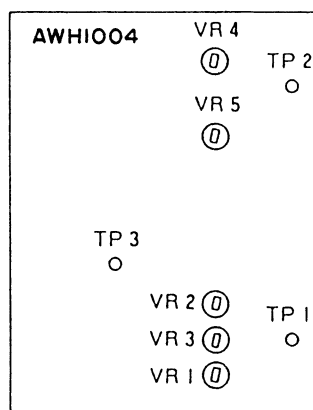


Figure 6-1 Power Amplifier Assembly Adjustment

6.2 Adjusting the Dynamic Power Supply Assembly

■ Adjusting the idle current

Connect the voltmeter to the TP terminal. Rotate VR1 so that the TP terminal voltage will be $11 \text{ mV} +/\text{- } 1 \text{ mV}$.

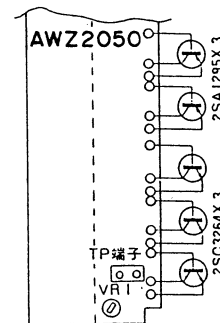


Figure 6-2 Dynamic Power Supply Assembly Adjustment

6.3 Adjusting the Meter Amplifier Assembly

1. Rotate VR2 in the non-input state so that the meter pointer will be at the zero point.
2. Connect the low-frequency oscillator to the input terminal to input 1 kHz signal with 49 V output. At that time, rotate VR3 so that the meter pointer will be at the position for 0 dB.
3. Next, change the oscillator output to 1.55 V (1 kHz) and rotate VR2 so that the meter pointer will indicate the -30 dB position.

Note:

Repeat Steps 2 and 3 several times until the meter pointer will precisely indicate the 0 dB and -30 dB positions, respectively.

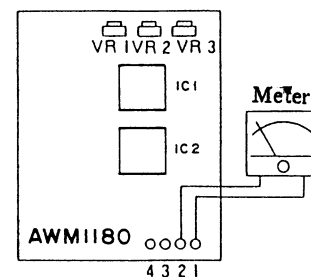


Figure 6-3 Meter Amplifier Assembly Adjustment

6.4 Adjusting the Power Supply Assembly

Connect the voltmeter to terminal No. 6 of the power supply assembly and rotate VR1 so that the voltage of terminal No. 6 will be $90 \text{ V} +/\text{- } 0.2 \text{ V}$. In the same manner, connect the voltmeter to terminal No. 8 and adjust VR2 so that the voltage of terminal No. 8 will be $90 \text{ V} +/\text{- } 0.2 \text{ V}$.

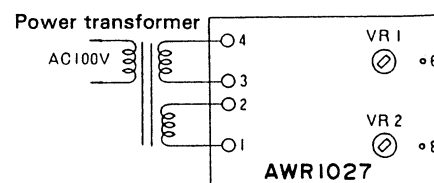


Figure 6-4 Power Supply Assembly Adjustment

FRONT PANEL AND FUNCTIONS

POWER switch

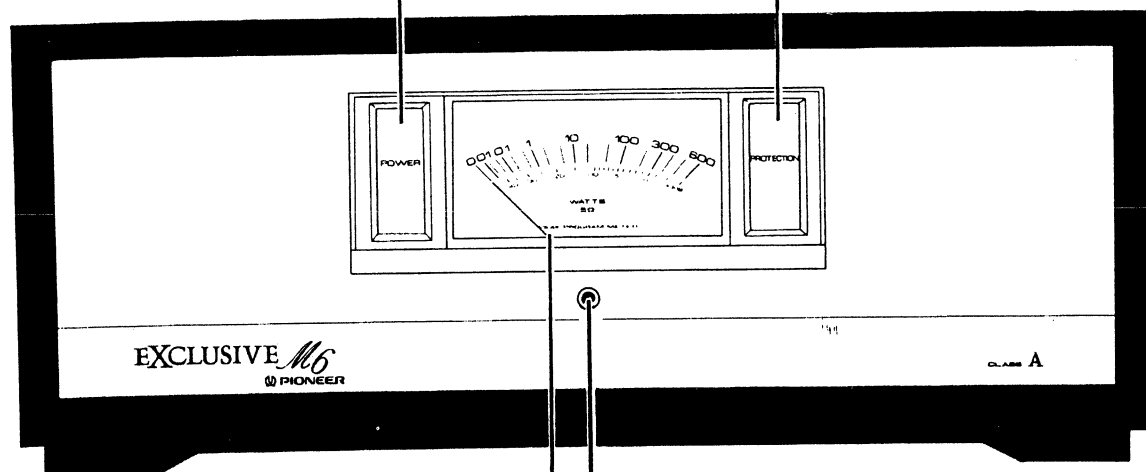
Press to turn amplifier power ON/OFF. When turned On, the protection indicator lights up.

The speakers will produce no sound for about 12 seconds because the muting circuit is activated to prevent switching noise.

PROTECTION indicator

Glows for about 12 seconds when the POWER switch is turned on. While this indicator is on, the protection circuit operates to prevent speaker output. The PROTECTION indicator is not a switch.

If the PROTECTION indicator does not go off, turn the amplifier POWER switch OFF and check the connections. Read the description of the protection circuit on page 14. If the cause is not found, contact your nearest PIONEER authorized service center or service station.



PEAK PROGRAM METER

The PEAK PROGRAM METER shows the output level when a speaker system of 8 ohms nominal impedance is connected to the speaker terminals. The instantaneous peak value is indicated using the peak hold function.

Peak Program Meter Zero-Point Adjustment Screw

The zero-point adjustment screw under the meter adjusts the meter's zero-point. The amplifier's zero point is correctly adjusted before delivery. If the starting zero point has changed, adjust the needle to the zero point using a small screwdriver.

8. SPECIFICATION

Continuous power output (both channels driven at 20Hz to 20kHz)*

T.H.D. 0.05%, 8Ω 300W

DIN continuous power output (both channels driven)

1kHz, T.H.D. 0.7%, 8Ω 300W

1kHz, T.H.D. 0.7%, 4Ω 500W

Power bandwidth

0.05, 8Ω 10Hz-40kHz

Damping factor

(20Hz to 20kHz), 8Ω 100

Dynamic power output (on EIA dynamic test signal)

4Ω 700W

Total harmonic distortion *

1kHz, 300W, 8Ω 0.05%

1kHz, 1W, 8Ω 0.01%

20Hz to 20kHz, 30W, 8Ω 0.01%

Inter-modulation distortion (at rated output) 0.05%

Input sensitivity/impedance

Power in

INPUT1 1.5V/50kΩ (unbalanced)

INPUT2 1.5V/600Ω (balanced)

Frequency response

INPUT 1Hz to 150kHz ±3 dB

Signal-to-Noise ratio (DIN, continuous power)

Power IN 85dB

Signal-to-Noise ratio (IHF short-circuited A-network)

Power IN 120dB

Power Supply/Miscellaneous

Power requirements a.c. 220V~230V, 50/60Hz

Power consumption 1200W

Dimensions 468(W) × 206(H) × 417(D)mm

Weight (without package) 28.2kg

Accessories

Operating instructions 1

Pin-plug cord 1

- *Specifications and design subject to possible modification without notice due to improvements.*
- ** Measured by Audio Spectrum Analyzer.*

POWER-CORD CAUTION

Handle the power cord by the plug. Do not pull out the plug by tugging the cord and never touch the power cord when your hands are wet as this could cause a short circuit or electric shock. Do not place the unit, a piece of furniture, etc., on the power cord, or pinch the cord. Never make a knot in the cord or tie it with other cords. The power cords should be routed such that they are not likely to be stepped on. A damaged power cord can cause fire or give you an electrical shock. Check the power cord once in a while. When you find it damaged, ask your nearest PIONEER authorized service center or your dealer for a replacement.

MAINTENANCE OF EXTERNAL SURFACES

- Use a polishing cloth or dry cloth to wipe off dust and dirt.
- When the surfaces are very dirty, wipe with a soft cloth dipped in some neutral cleanser diluted five or six times with water, and wrung out well, and then wipe again with a dry cloth. Do not use furniture wax or cleaners.
- Never use thinners, benzine, insecticide sprays and other chemicals on or near this unit, since these will corrode the surfaces.